

p145 Q26

$$E_K = \frac{1}{2} m v^2$$

$$m_1 = 2 m_2$$

$$E_{K1} = \frac{1}{2} E_{K2}$$

$$\frac{1}{2} m_1 (v_1 + 5)^2 = \frac{1}{2} m_2 (v_2 + 5)^2$$

$$\cancel{\frac{1}{2}} m_1 v_1^2 = \cancel{\frac{1}{2}} \left(\frac{1}{2} m_2 v_2^2 \right)$$

$$\cancel{\frac{1}{2}} m_1 v_1^2 = \cancel{\frac{1}{2}} \left(\frac{1}{2} m_1 v_2^2 \right)$$

$$v_1^2 = \frac{1}{4} v_2^2$$

$$v_1 = \frac{1}{2} v_2$$

$$m_1 \left(\frac{1}{2} v_2 + 5 \right)^2 = \frac{1}{2} m_1 (v_2 + 5)^2$$

$$\frac{1}{2} v_2 + 5 = \frac{1}{\sqrt{2}} (v_2 + 5)$$

$$(1 \quad 1) \quad v_1 = 5$$

$$\left(\frac{1}{\alpha} - \frac{1}{\sqrt{\alpha}}\right) V_{\alpha} = \frac{5}{\sqrt{\alpha}} - 5$$

$$V_{\alpha} = 7.07 \text{ m/s}$$

$$V_1 = 3.5 \text{ m/s}$$